

Building Site Development
SARGENT COUNTY, NORTH DAKOTA

Soil properties influence the development of building sites, including the selection of the site, the design of the structure, construction, performance after construction, and maintenance. The following tables show the degree and kind of soil limitations that affect dwellings with and without basements, small commercial buildings, local roads and streets, shallow excavations, and lawns and landscaping.

Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect building site development. Not limited indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. Slight indicates that the soil has features that are favorable for the specified use. The limitations are minor and can be easily overcome. Good performance and low maintenance can be expected. Moderate indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. Severe indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Dwellings are single-family houses of three stories or less. For dwellings without basements, the foundation is assumed to consist of spread footings of reinforced concrete built on undisturbed soil at a depth of 2 feet or at the depth of maximum frost penetration, whichever is deeper. For dwellings with basements, the foundation is assumed to consist of spread footings of reinforced concrete built on undisturbed soil at a depth of about 7 feet. The ratings for dwellings are based on the soil properties that affect the capacity of the soil to support a load without movement and on the properties that affect excavation and construction costs. The properties that affect the load-supporting capacity include depth to a water table, ponding, flooding, subsidence, linear extensibility (shrink-swell potential), and compressibility. Compressibility is inferred from the Unified classification. The properties that affect the ease and amount of excavation include depth to a water table, ponding, flooding, slope, depth to bedrock or a cemented pan, hardness of bedrock or a cemented pan, and the amount and size of rock fragments.

Small commercial buildings are structures that are less than three stories high and do not have basements. The foundation is assumed to consist of spread footings of reinforced concrete built on undisturbed soil at a depth of 2 feet or at the depth of maximum frost penetration, whichever is deeper. The ratings are based on the soil properties that affect the capacity of the soil to support a load without movement and on the properties that affect excavation and construction costs. The properties that affect the load-supporting capacity include depth to a water table, ponding, flooding, subsidence, linear extensibility (shrink-swell potential), and compressibility (which is inferred from the Unified classification). The properties that affect the ease and amount of excavation include flooding, depth to a water table, ponding, slope, depth to bedrock or a cemented pan, hardness of bedrock or a cemented pan, and the amount and size of rock fragments.

Local roads and streets have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material; a base of gravel, crushed rock, or soil material stabilized by lime or cement; and a surface of flexible material (asphalt), rigid material (concrete), or gravel with a binder. The ratings are based on the soil properties that affect the ease of excavation and grading and the traffic-supporting capacity. The properties that affect the ease of excavation and grading are depth to bedrock or a cemented pan, hardness of bedrock or a cemented pan, depth to a water table, ponding, flooding, the amount of large stones, and slope. The properties that affect the traffic-supporting capacity are soil strength (as inferred from the AASHTO group index number), subsidence, linear extensibility (shrink-swell potential), the potential for frost action, depth to a water table, and ponding.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for graves, utility lines, open ditches, or other purposes. The ratings are based on the soil properties that influence the ease of digging and the resistance to sloughing. Depth to bedrock or a cemented pan, hardness of bedrock or a cemented pan, the amount of large stones, and dense layers influence the ease of digging, filling, and compacting. Depth to the seasonal high water table, flooding, and ponding may restrict the period when excavations can be made. Slope influences the ease of using machinery. Soil texture, depth to the water table, and linear extensibility (shrink-swell potential) influence the resistance to sloughing.

Lawns and landscaping require soils on which turf and ornamental trees and shrubs can be established and maintained. Irrigation is not considered in the ratings. The ratings are based on the soil properties that affect plant growth and trafficability after vegetation is established. The properties that affect plant growth are reaction; depth to a water table; ponding; depth to bedrock or a cemented pan; the available water capacity in the upper 40 inches; the content of salts, sodium, or calcium carbonate; and sulfidic materials. The properties that affect trafficability are flooding, depth to a water table, ponding, slope, stoniness, and the amount of sand, clay, or organic matter in the surface layer.

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Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
Aa: Aastad-----	Moderate: wetness	Moderate: shrink-swell	Moderate: shrink-swell wetness	Moderate: shrink-swell	Severe: low strength	Slight
Ab: Aastad-----	Moderate: wetness	Moderate: shrink-swell	Moderate: shrink-swell wetness	Moderate: shrink-swell	Severe: low strength	Slight
Ac: Aastad-----	Moderate: wetness	Moderate: shrink-swell	Moderate: shrink-swell wetness	Moderate: shrink-swell	Severe: low strength	Slight
Cresbard-----	Moderate: too clayey wetness	Severe: shrink-swell	Moderate: shrink-swell wetness	Severe: shrink-swell	Severe: low strength shrink-swell	Severe: excess sodium
Ad: Aberdeen-----	Severe: cutbanks cave	Severe: shrink-swell	Severe: shrink-swell	Severe: shrink-swell	Severe: low strength shrink-swell	Severe: excess sodium
Ae: Aberdeen-----	Severe: cutbanks cave	Severe: shrink-swell	Severe: shrink-swell	Severe: shrink-swell	Severe: low strength shrink-swell	Severe: excess sodium
Exline-----	Severe: wetness cutbanks cave	Severe: shrink-swell	Severe: wetness	Severe: shrink-swell	Severe: low strength shrink-swell	Severe: excess sodium
An: Arveson-----	Severe: wetness cutbanks cave	Severe: wetness	Severe: wetness	Severe: wetness	Severe: frost action wetness	Severe: wetness
BbC: Barnes-----	Slight	Moderate: shrink-swell	Moderate: shrink-swell	Moderate: shrink-swell slope	Severe: low strength	Slight
Buse-----	Slight	Moderate: shrink-swell	Moderate: shrink-swell	Moderate: shrink-swell slope	Severe: low strength	Slight
BbC2: Barnes, ERODED-----	Slight	Moderate: shrink-swell	Moderate: shrink-swell	Moderate: shrink-swell slope	Severe: low strength	Slight
Buse, ERODED-----	Slight	Moderate: shrink-swell	Moderate: shrink-swell	Moderate: shrink-swell slope	Severe: low strength	Slight
Bc: Barnes, STONY-----	Slight	Slight	Slight	Moderate: slope	Moderate: frost action low strength	Moderate: large stones
Buse, STONY-----	Moderate: large stones	Moderate: large stones shrink-swell	Moderate: large stones shrink-swell	Moderate: large stones shrink-swell slope	Moderate: low strength shrink-swell	Severe: large stones
BdB: Barnes-----	Slight	Moderate: shrink-swell	Moderate: shrink-swell	Moderate: shrink-swell slope	Severe: low strength	Slight
Svea-----	Moderate: wetness	Moderate: shrink-swell	Moderate: shrink-swell wetness	Moderate: shrink-swell slope	Severe: low strength	Slight

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BdB2: Barnes, ERODED-----	Slight	Moderate: shrink-swell	Moderate: shrink-swell	Moderate: shrink-swell	Severe: low strength	Slight
Svea, ERODED-----	Moderate: wetness	Moderate: shrink-swell	Moderate: shrink-swell wetness	Moderate: shrink-swell	Severe: low strength	Slight
Bf: Bearden-----	Severe: wetness	Moderate: shrink-swell wetness	Severe: shrink-swell wetness	Moderate: shrink-swell wetness	Severe: frost action low strength	Moderate: wetness
Bk: Bearden-----	Severe: wetness	Moderate: shrink-swell wetness	Severe: shrink-swell wetness	Moderate: shrink-swell wetness	Severe: frost action low strength	Moderate: wetness
Tetonka-----	Severe: ponding	Severe: shrink-swell ponding	Severe: shrink-swell ponding	Severe: shrink-swell ponding	Severe: low strength shrink-swell ponding	Severe: ponding
Br: Borup-----	Severe: wetness cutbanks cave	Severe: wetness	Severe: wetness	Severe: wetness	Severe: frost action wetness	Severe: wetness
Colvin-----	Severe: wetness	Severe: wetness	Severe: wetness	Severe: wetness	Severe: frost action low strength wetness	Severe: wetness
Perella-----	Severe: ponding	Severe: ponding	Severe: ponding	Severe: ponding	Severe: frost action low strength ponding	Severe: ponding
BvD: Buse-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: low strength slope	Severe: slope
Barnes-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: low strength slope	Severe: slope
BvD2: Buse, ERODRED-----	Moderate: slope	Moderate: shrink-swell slope	Moderate: shrink-swell slope	Severe: slope	Severe: low strength	Moderate: slope
Barnes, ERODED-----	Moderate: slope	Moderate: shrink-swell slope	Moderate: shrink-swell slope	Severe: slope	Severe: low strength	Moderate: slope
Cp: Colvin, SALINE-----	Severe: wetness	Severe: flooding wetness	Severe: flooding wetness	Severe: flooding wetness	Severe: flooding low strength wetness	Severe: excess salt wetness
Perella, SALINE-----	Severe: wetness	Severe: wetness	Severe: wetness	Severe: wetness	Severe: frost action low strength wetness	Severe: excess salt wetness
Dc: Dimmick-----	Severe: ponding	Severe: shrink-swell ponding	Severe: shrink-swell ponding	Severe: shrink-swell ponding	Severe: low strength shrink-swell ponding	Severe: too clayey ponding

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Dm: Dimmick, BASINS-----	Severe: ponding	Severe: shrink-swell ponding	Severe: shrink-swell ponding	Severe: shrink-swell ponding	Severe: low strength shrink-swell ponding	Severe: too clayey ponding
Dv: Divide-----	Severe: wetness cutbanks cave	Moderate: wetness	Severe: wetness	Moderate: wetness	Moderate: frost action wetness	Moderate: wetness
EcA: Eckman-----	Slight	Slight	Slight	Slight	Severe: frost action	Slight
EcB: Eckman-----	Slight	Slight	Slight	Moderate: slope	Severe: frost action	Slight
EmB: Eckman-----	Slight	Slight	Slight	Moderate: slope	Severe: frost action	Slight
Maddock-----	Severe: cutbanks cave	Slight	Slight	Moderate: slope	Slight	Moderate: droughty
EmC: Eckman-----	Slight	Slight	Slight	Moderate: slope	Severe: frost action	Slight
Maddock-----	Severe: cutbanks cave	Slight	Slight	Moderate: slope	Slight	Moderate: droughty
Ex: Exline-----	Severe: wetness cutbanks cave	Severe: shrink-swell	Severe: wetness	Severe: shrink-swell	Severe: low strength shrink-swell	Severe: excess sodium
Fc: Fargo-----	Severe: wetness cutbanks cave	Severe: shrink-swell wetness	Severe: shrink-swell wetness	Severe: shrink-swell wetness	Severe: low strength shrink-swell wetness	Severe: too clayey wetness
FoB: Forman-----	Slight	Moderate: shrink-swell	Moderate: shrink-swell	Moderate: shrink-swell slope	Moderate: low strength shrink-swell	Slight
Aastad-----	Moderate: wetness	Moderate: shrink-swell	Moderate: shrink-swell wetness	Moderate: shrink-swell slope	Severe: low strength	Slight
FoB2: Forman, ERODED-----	Slight	Moderate: shrink-swell	Moderate: shrink-swell	Moderate: shrink-swell slope	Moderate: low strength shrink-swell	Slight
Aastad, ERODED-----	Moderate: wetness	Moderate: shrink-swell	Moderate: shrink-swell wetness	Moderate: shrink-swell slope	Severe: low strength	Slight
Fs: Forman, STONY-----	Moderate: large stones	Moderate: large stones shrink-swell	Moderate: large stones shrink-swell	Moderate: large stones shrink-swell slope	Moderate: low strength shrink-swell	Severe: large stones
Aastad, STONY-----	Moderate: wetness	Moderate: shrink-swell	Moderate: shrink-swell wetness	Moderate: shrink-swell slope	Severe: low strength	Slight
FvC: Forman-----	Slight	Moderate: shrink-swell	Moderate: shrink-swell	Moderate: shrink-swell slope	Moderate: low strength shrink-swell	Slight

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Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
Buse-----	Slight	Moderate: shrink-swell	Moderate: shrink-swell	Moderate: shrink-swell slope	Severe: low strength	Slight
FvC2: Forman, ERODED-----	Slight	Moderate: shrink-swell	Moderate: shrink-swell	Moderate: shrink-swell slope	Moderate: low strength shrink-swell	Slight
Buse, ERODED-----	Slight	Moderate: shrink-swell	Moderate: shrink-swell	Moderate: shrink-swell slope	Severe: low strength	Slight
Fw: Southam Soils-----	Severe: ponding	Severe: shrink-swell ponding	Severe: shrink-swell ponding	Severe: shrink-swell ponding	Severe: low strength shrink-swell ponding	Severe: ponding
Ga: Gannett-----	Severe: ponding cutbanks cave	Severe: ponding	Severe: ponding	Severe: ponding	Severe: ponding	Severe: ponding
GgA: Gardena, SANDY SUBSTRATUM-----	Moderate: wetness	Slight	Moderate: wetness	Slight	Severe: frost action	Slight
Glyndon, SANDY SUBSTRATUM-----	Severe: cutbanks cave	Slight	Moderate: wetness	Slight	Severe: frost action	Slight
GmA: Gardena-----	Moderate: wetness	Slight	Moderate: wetness	Slight	Severe: frost action	Slight
Glyndon-----	Severe: cutbanks cave	Slight	Moderate: wetness	Slight	Severe: frost action	Slight
GoA: Glyndon, SANDY SUBSTRATUM-----	Severe: cutbanks cave	Slight	Moderate: wetness	Slight	Severe: frost action	Slight
GsA: Glyndon-----	Severe: cutbanks cave	Slight	Moderate: wetness	Slight	Severe: frost action	Slight
Ha: Hamar-----	Severe: wetness cutbanks cave	Severe: wetness	Severe: wetness	Severe: wetness	Moderate: frost action wetness	Moderate: wetness droughty
Hb: Hamerly-----	Severe: wetness	Moderate: shrink-swell wetness	Severe: wetness	Moderate: shrink-swell wetness	Severe: frost action	Moderate: wetness
Hf: Hamerly-----	Severe: wetness	Moderate: shrink-swell wetness	Severe: wetness	Moderate: shrink-swell wetness	Severe: frost action	Moderate: wetness
Aastad-----	Moderate: wetness	Moderate: shrink-swell	Moderate: shrink-swell wetness	Moderate: shrink-swell	Severe: low strength	Slight
HfA: Hegne-----	Severe: wetness cutbanks cave	Severe: shrink-swell wetness	Severe: shrink-swell wetness	Severe: shrink-swell wetness	Severe: low strength shrink-swell wetness	Severe: too clayey wetness

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Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
Fargo-----	Severe: wetness cutbanks cave	Severe: shrink-swell wetness	Severe: shrink-swell wetness	Severe: shrink-swell wetness	Severe: low strength shrink-swell wetness	Severe: too clayey wetness
Hh: Hamerly-----	Severe: wetness	Moderate: shrink-swell wetness	Severe: wetness	Moderate: shrink-swell wetness	Severe: frost action	Moderate: wetness
Svea-----	Moderate: wetness	Moderate: shrink-swell	Moderate: shrink-swell wetness	Moderate: shrink-swell	Severe: low strength	Slight
Hkx: Hecla-----	Severe: wetness cutbanks cave	Moderate: wetness	Severe: wetness	Moderate: wetness	Moderate: wetness	Moderate: wetness droughty
HlAx: Hecla-----	Severe: cutbanks cave	Slight	Moderate: wetness	Slight	Moderate: frost action	Moderate: droughty
HlBx: Hecla-----	Severe: cutbanks cave	Slight	Moderate: wetness	Moderate: slope	Moderate: frost action	Moderate: droughty
HmA: Hecla, MODERATELY SHALLOW-----	Moderate: wetness	Slight	Moderate: shrink-swell wetness	Slight	Moderate: frost action	Slight
HnAx: Hecla-----	Severe: cutbanks cave	Slight	Moderate: wetness	Slight	Moderate: frost action	Moderate: droughty
HoA: Hecla, MODERATELY SHALLOW-----	Severe: cutbanks cave	Slight	Moderate: shrink-swell wetness	Slight	Moderate: frost action	Moderate: droughty
Hwx: Hecla-----	Severe: cutbanks cave	Slight	Moderate: wetness	Moderate: slope	Moderate: frost action	Moderate: droughty
Maddock-----	Severe: cutbanks cave	Slight	Slight	Moderate: slope	Slight	Moderate: droughty
Hz: Hegne-----	Severe: wetness cutbanks cave	Severe: shrink-swell wetness	Severe: shrink-swell wetness	Severe: shrink-swell wetness	Severe: low strength shrink-swell wetness	Severe: too clayey wetness
La: Lamoure-----	Severe: wetness	Severe: flooding wetness	Severe: flooding wetness	Severe: flooding wetness	Severe: flooding low strength wetness	Severe: flooding wetness
Lf: Channeled-----	Moderate: wetness	Severe: flooding	Severe: flooding	Severe: flooding	Moderate: flooding low strength shrink-swell	Slight
Fairdale-----	Moderate: flooding wetness	Severe: flooding	Severe: flooding	Severe: flooding	Severe: flooding	Severe: flooding
La Prairie-----	Moderate: flooding wetness	Severe: flooding	Severe: flooding	Severe: flooding	Severe: flooding low strength	Severe: flooding

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Lp: La Prairie-----	Moderate: flooding wetness	Severe: flooding	Severe: flooding	Severe: flooding	Severe: flooding low strength	Moderate: flooding
M-W: Miscellaneous Water-----	---	---	---	---	---	---
MdBx: Maddock-----	Severe: cutbanks cave	Slight	Slight	Slight	Slight	Moderate: droughty
MdC: Maddock-----	Severe: cutbanks cave	Moderate: slope	Moderate: slope	Severe: slope	Moderate: slope	Moderate: slope droughty
MkAx: Maddock, MODERATELY SHALLOW-----	Severe: cutbanks cave	Slight	Moderate: shrink-swell	Slight	Slight	Slight
MkBx: Maddock, MODERATELY SHALLOW-----	Severe: cutbanks cave	Slight	Moderate: shrink-swell	Moderate: slope	Slight	Slight
MkCx: Maddock, MODERATELY SHALLOW-----	Severe: cutbanks cave	Slight	Moderate: shrink-swell	Moderate: slope	Slight	Slight
OaA: Overly-----	Moderate: too clayey wetness	Moderate: shrink-swell	Moderate: shrink-swell wetness	Moderate: shrink-swell	Severe: frost action low strength	Slight
OcB: Overly-----	Moderate: too clayey wetness	Moderate: shrink-swell	Moderate: shrink-swell wetness	Moderate: shrink-swell slope	Severe: frost action low strength	Slight
Os: Overly-----	Moderate: too clayey wetness	Moderate: shrink-swell	Moderate: shrink-swell wetness	Moderate: shrink-swell	Severe: frost action low strength	Slight
Aastad-----	Moderate: wetness	Moderate: shrink-swell	Moderate: shrink-swell wetness	Moderate: shrink-swell	Severe: low strength	Slight
OvC: Overly-----	Moderate: too clayey wetness	Moderate: shrink-swell	Moderate: shrink-swell wetness	Moderate: shrink-swell slope	Severe: frost action low strength	Slight
Barnes-----	Slight	Moderate: shrink-swell	Moderate: shrink-swell	Moderate: shrink-swell slope	Severe: low strength	Slight
OyA: Overly-----	Moderate: too clayey wetness	Moderate: shrink-swell	Moderate: shrink-swell wetness	Moderate: shrink-swell	Severe: frost action low strength	Slight
Bearden-----	Severe: wetness	Moderate: shrink-swell wetness	Severe: shrink-swell wetness	Moderate: shrink-swell wetness	Severe: frost action low strength	Moderate: wetness
Pa: Parnell-----	Severe: excess humus ponding	Severe: shrink-swell ponding	Severe: shrink-swell ponding	Severe: shrink-swell ponding	Severe: low strength shrink-swell ponding	Severe: ponding

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Pe: Perella-----	Severe: ponding	Severe: ponding	Severe: ponding	Severe: ponding	Severe: frost action low strength ponding	Severe: ponding
Pg: Pits-----	Severe: slope cutbanks cave	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope small stones droughty
Ra: Rauville-----	Severe: wetness cutbanks cave	Severe: flooding wetness	Severe: flooding wetness	Severe: flooding wetness	Severe: flooding low strength wetness	Severe: flooding wetness
RhA: Renshaw-----	Severe: cutbanks cave	Slight	Slight	Slight	Slight	Slight
RhB: Renshaw-----	Severe: cutbanks cave	Slight	Slight	Moderate: slope	Slight	Slight
Ro: Renshaw-----	Severe: cutbanks cave	Slight	Slight	Moderate: slope	Slight	Moderate: droughty
Sioux-----	Severe: cutbanks cave	Slight	Slight	Moderate: slope	Slight	Moderate: droughty
SpA: Spottswood-----	Severe: cutbanks cave	Slight	Moderate: wetness	Slight	Moderate: frost action	Slight
Wessington-----	Severe: cutbanks cave	Slight	Slight	Slight	Slight	Moderate: droughty
St: Stirum-----	Severe: ponding cutbanks cave	Severe: ponding	Severe: ponding	Severe: ponding	Severe: ponding	Severe: excess sodium ponding
Arveson-----	Severe: wetness cutbanks cave	Severe: wetness	Severe: wetness	Severe: wetness	Severe: frost action wetness	Severe: wetness
Sv: Svea-----	Moderate: wetness	Moderate: shrink-swell	Moderate: shrink-swell wetness	Moderate: shrink-swell	Severe: low strength	Slight
Tk: Tetonka-----	Severe: ponding	Severe: shrink-swell ponding	Severe: shrink-swell ponding	Severe: shrink-swell ponding	Severe: low strength shrink-swell ponding	Severe: ponding
Tp: Parnell-----	Severe: excess humus ponding	Severe: shrink-swell ponding	Severe: shrink-swell ponding	Severe: shrink-swell ponding	Severe: low strength shrink-swell ponding	Severe: ponding
Tetonka-----	Severe: ponding	Severe: shrink-swell ponding	Severe: shrink-swell ponding	Severe: shrink-swell ponding	Severe: low strength shrink-swell ponding	Severe: ponding
Un: Ulen, MODERATELY SHALLOW	Severe: wetness cutbanks cave	Moderate: wetness	Severe: wetness	Moderate: wetness	Moderate: frost action wetness	Moderate: wetness droughty

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VaD: Valentine-----	Severe: cutbanks cave	Moderate: slope	Moderate: slope	Severe: slope	Moderate: slope	Moderate: slope droughty
VhC: Valentine-----	Severe: cutbanks cave	Slight	Slight	Slight	Slight	Moderate: droughty
Hecla-----	Severe: wetness cutbanks cave	Moderate: wetness	Severe: wetness	Moderate: wetness	Moderate: wetness	Moderate: wetness droughty
W: Water-----	---	---	---	---	---	---
ZmC: Zell-----	Slight	Slight	Slight	Moderate: slope	Severe: frost action	Slight
ZmD: Zell-----	Moderate: slope	Moderate: slope	Moderate: slope	Severe: slope	Severe: frost action	Moderate: slope

